

WHAT IS CLAIMED IS:

- 1                   1.       A coupling device comprising:  
2                   a coupling device body, having  
3                   a first receptacle operable for coupling with a first syringe having a first  
4                   volumetric size;  
5                   a second receptacle operable for coupling with a second syringe having a  
6                   second volumetric size;  
7                   a channel disposed between said first receptacle and said second receptacle so  
8                   as to allow fluid to flow from said first receptacle to said second receptacle;  
9                   wherein said first volumetric size is different from said second volumetric  
10                  size.
- 1                   2.       The coupling device as described in claim 1 wherein said first  
2                   receptacle is sized to accept a first barrel size and wherein said second receptacle is sized to  
3                   accept a second barrel size different from said first barrel size.
- 1                   3.       The coupling device as described in claim 1 wherein said channel is  
2                   configured so as to be substantially cylindrical with a diameter in the range of about 0.4  
3                   millimeters to about 0.6 millimeters.
- 1                   4.       The coupling device as described in claim 1 wherein said first  
2                   receptacle is operable for coupling with a 250 microliter syringe.
- 1                   5.       The coupling device as described in claim 1 wherein said second  
2                   receptacle is operable for coupling with a 10 microliter syringe.
- 1                   6.       The coupling device as described in claim 1 wherein said first  
2                   receptacle is operable for coupling with a 250 microliter syringe and wherein said second  
3                   receptacle is operable for coupling with a 10 microliter syringe.
- 1                   7.       The coupling device as described in claim 1 wherein said channel is  
2                   operable for transferring a viscous material from said first syringe to said second syringe.

1                   8.       The coupling device as described in claim 1 wherein said coupling  
2 device body is comprised of a non-metallic material.

1                   9.       The coupling device as described in claim 9 wherein said non-metallic  
2 material comprises PEEK.

1                   10.      The coupling device as described in claim 1 and further comprising:  
2 a first ferrule for use in coupling said first syringe with said coupling device.

1                   11.      The coupling device as described in claim 1 and further comprising:  
2 a second ferrule for use in coupling said second syringe with said coupling  
3 device.

1                   12.      A method of coupling a first syringe and a second syringe, said method  
2 comprising:

3                   providing a coupling device body having a first receptacle and a second  
4 receptacle and a channel disposed between the first receptacle and the second receptacle;

5                   coupling a first syringe to the first receptacle and a second syringe to the  
6 second receptacle, with the first syringe having a volumetric size that is different from a  
7 volumetric size of the second syringe.

1                   13.      The method as described in claim 12 wherein said first receptacle is  
2 sized to accept a first barrel size and wherein said second receptacle is sized to accept a  
3 second barrel size different from said first barrel size.

1                   14.      The method as described in claim 12 wherein said channel comprises a  
2 substantially cylindrical shape with a diameter in the range of about 0.4 millimeters to about  
3 0.6 millimeters.

1                   15.      The method as described in claim 12 and further comprising:  
2 disposing a needle in said channel.

1                   16.     The method as described in claim 12 wherein said coupling said first  
2 syringe to said first receptacle comprises:

3                   coupling a 250 microliter syringe to said first receptacle.

1                   17.     The method as described in claim 12 wherein said coupling said  
2 second syringe to said second receptacle comprises:

3                   coupling a 10 microliter syringe to said second receptacle.

1                   18.     The method as described in claim 12 and further comprising:  
2 transferring viscous material from said first syringe to said second syringe.

1                   19.     The method as described in claim 18, wherein the viscous material has  
2 a viscosity in the range from about 100,000 centipoise to about 300,000 centipoise.

1                   20.     The method as described in claim 12 and further comprising:  
2 utilizing a non-metallic material as said coupling device body.

1                   21.     The method as described in claim 20 and further comprising: utilizing  
2 PEEK as said non-metallic material.

1                   22.     The method as described in claim 12 and further comprising:  
2 disposing a first ferrule in said first receptacle, said first ferrule configured for  
3 coupling said first syringe with said first receptacle.

1                   23.     The method as described in claim 12 and further comprising:  
2 disposing a second ferrule in said second receptacle, said second ferrule  
3 configured for coupling said second syringe with said second receptacle.

1                   24.     The method as described in claim 12 and further comprising:  
2 disposing a first ferrule in said first receptacle, said first ferrule configured for  
3 coupling said first syringe with said first receptacle;

4 disposing a second ferrule in said second receptacle, said second ferrule  
5 configured for coupling said second syringe with said second receptacle.

1 25. A method of mixing a LCP comprising:  
2 providing a first syringe having a syringe barrel;  
3 depositing a lipid material in said syringe barrel;  
4 adding protein material to said syringe barrel;  
5 mixing said lipid material and said protein material in said syringe barrel to  
6 form said LCP in said syringe barrel.

1 26. The method as described in claim 25 and further comprising:  
2 utilizing a second syringe to add said protein material to said first syringe  
3 barrel.

1 27. The method as described in claim 25 and further comprising:  
2 transferring said protein material and said lipid material to said second  
3 syringe.

1 28. The method as described in claim 25 and further comprising:  
2 dispensing said LCP material in a plurality of holding locations.

1 29. The method as described in claim 25 and wherein the holding locations  
2 comprise an array of wells in a well plate.

1 30. The method as described in claim 25 and further comprising:  
2 dispensing said LCP material on a microwell array.

1 31. The method as described in claim 25 and further comprising:  
2 dispensing said LCP material in a container;  
3 adding crystallization promoting material to said container;

growing a protein crystal from said LCP material and said crystallization promoting material in said container.

32. The method as described in claim 31 and further comprising:  
drying said crystallization promoting material prior to said dispensing said LCP material in said container.

33. A method of transferring viscous material, said method comprising:  
providing a first syringe barrel containing a volume of viscous material, said first syringe barrel having a first volumetric size;  
providing a coupling device;  
coupling said first syringe barrel with said coupling device;  
providing a second syringe barrel, said second syringe barrel having a second volumetric size different from said first volumetric size of said first syringe barrel;  
coupling said second syringe barrel with said coupling device;  
transferring at least a portion of said volume of viscous material from said first syringe barrel to said second syringe barrel through said coupling device.

34. The method as described in claim 33 and further comprising:  
transferring said viscous material through a channel of said coupling device.

35. The method as described in claim 34 and further comprising:  
transferring said viscous material through a needle disposed in said channel.

36. The method as described in claim 35 and further comprising:  
utilizing a needle having a length less than about 20 millimeters.

37. The method as described in claim 36 and further comprising:  
utilizing a needle having an outside diameter of approximately 0.65 millimeters.

1                   38.     The method as in claim 33, wherein the viscous material has a  
2 viscosity in the range from about 100,000 centipoise to about 300,000 centipoise.

1                   39.     The method as in claim 33, wherein the viscous material comprises  
2 lipidic mesophase material.

1                   40.     An apparatus for dispensing viscous material, said apparatus  
2 comprising:

3                   a syringe barrel;

4                   a syringe plunger disposed in said syringe barrel;

5                   a needle having a length of less than about 20 millimeters and an outside  
6 diameter in the range of about 0.4 millimeters to about 0.72 millimeters;

7                   a ferrule operable for coupling said needle with said syringe barrel during use.

1                   41.     The apparatus as described in claim 40 wherein said viscous material  
2 comprises lipidic mesophase.

1                   42.     The apparatus as described in claim 40 wherein said syringe barrel is  
2 configured so as not to break when said viscous material is ejected from said needle.

1                   43.     A LCP mixing kit comprising:

2                   a coupling device for coupling a plurality of syringes in fluid communication,  
3 said coupling device having a first receptacle and a second receptacle, wherein said first  
4 receptacle has a different coupling size from said second receptacle;

5                   a first syringe operable for coupling with said coupling device; and

6                   a second syringe operable for coupling with said coupling device.

1                   44.     The LCP mixing kit as described in claim 43 and further comprising:

2                   a third syringe having a volume smaller than said first syringe.

1                   45.     The LCP mixing kit as described in claim 44 and further comprising:

2 a second coupling operable for coupling said first syringe with said second  
3 syringe.

1 46. The LCP mixing kit as described in claim 43 and further comprising:  
2 a repeating dispenser for repetitively measuring a predetermined quantity of  
3 LCP.

1 47. The LCP mixing kit as described in claim 43 and further comprising a  
2 well plate.

1 48. The LCP mixing kit as described in claim 43 and further comprising  
2 lipid material.

1 49. The LCP mixing kit as described in claim 43 and further comprising a  
2 buffer solution.

1 50. A method of dispensing a substance comprising LCP, said method  
2 comprising:

3 mixing said substance in a first syringe;

4 transferring said substance from said first syringe to a second syringe, said  
5 second syringe having a volume size smaller than the volume size of said first syringe;

6 utilizing said second syringe to dispense said LCP.

1 51. The method as described in claim 50 and further comprising:  
2 dispensing said LCP in a container.

1 52. The method as described in claim 50 and further comprising:  
2 dispensing said LCP in a well of a well plate.

1 53. The method as described in claim 50 and further comprising:  
2 dispensing said LCP on a microarray.

1 54. The method as described in claim 50 and further comprising:

2 dispensing said LCP in a solution for use in growing a protein crystal.